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SOCIO-SPATIAL LINKAGE NEIGHBOURHOOD DESIGN FOR YOUNG PROFESSIONALS

With References to Traditional Dwellings in the City of Beijing

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ABSTRACT

This research focuses on creating the 'liveability' (in terms of well-functioning control on the social relationship in a direct home environment) in the capital city. The great majority of the residence in this city are young professionals, and they are facing problems that their ideal housing type - which provides essential qualities as affordability (affordable rental housing), accessibility (connectivity to the workplace through public transportation) and liveable living condition (proper privacy, neither a social cage nor an anonymous community without green) does not really exist. Thus, this project is in motion to create strategic approaches towards a more friendly and liveable neighbourhood in new towns which locate on the periphery of the capital, learning from the local ecological and urban context and with references to the history of dwellings in the old Beijing through Spacemate. And eventually looking towards several approaches aim to achieve a balanced harmony between landscape and city, history and future development as the context for neighbourhood design, focus on the qualities of control on social interaction, historical continuity and sustainable green.

KEYWORDS

Socio-spatial Linkage; Liveable Neighbourhood; Young Migrants; Spatial Configuration; Traditional Dwellings; Spacemate

1. URBAN BACKGROUND

1.1 Housing Affordability in Beijing

Young professionals have relatively low income, therefore, it is difficult for them to find an affordable place where is not crowding. Housing affordability could be measured effectively through the ratio of housing cost to gross income. When the households spend 30% or less of gross income on housing cost, it could be considered as affordable for this household (Lowe. et al. 2013). In Beijing, there are four types of affordable housing, "Economic comfortable housing" "Fixed-price housing" "Cheap rental housing" and "Public rental housing". Economical and comfortable housing and "fixed-price housing are developed for sale. "Cheap rental housing" and "Public rental housing" are designed for rent. Economical and comfortable housing and "Fixed-price housing "is designed to encourage home ownership within the middle to low income households who cannot afford buying a house at market price (Lin, Y. et al, 2014). These programs only provide houses to urban residents with hukou. Thus young professionals, mostly are migrants who do not hold Beijing hukou are excluded. "Cheap rental housing" program is developed in motion to provide the house for the poorest urban residents that hold a Beijing hukou. The disadvantaged groups including people with disabilities and extremely low-income households (Shi.et al. 2016).

Rents in these households would be subsidised heavily by Chinese government. The properties are owned by the government or agencies (Lin, Y. et al, 2014). Young professionals are excluded again,

for most of them are not as poor as the extremely low income households although they have relatively low income. “Public rental housing” provides rental units to middle-and low-income households. “Besides citizens holding a Beijing hukou, some rural migrants are also eligible to apply for public rental housing” (Lin, Y. et al, 2014). Thus only this program included young professionals. However public rental housing is in the situation of serious short supply considering a large number of young professionals. Public rental housing accounts for only 7%, a small portion of the total housing stock. In contrast, the high price market-oriented commercial housing accounts for 32% (Figure 1). Public rental housing mostly located outside of centre in Beijing (Figure 2). Young professionals who want to apply affordable housing have to live outside the city centre.

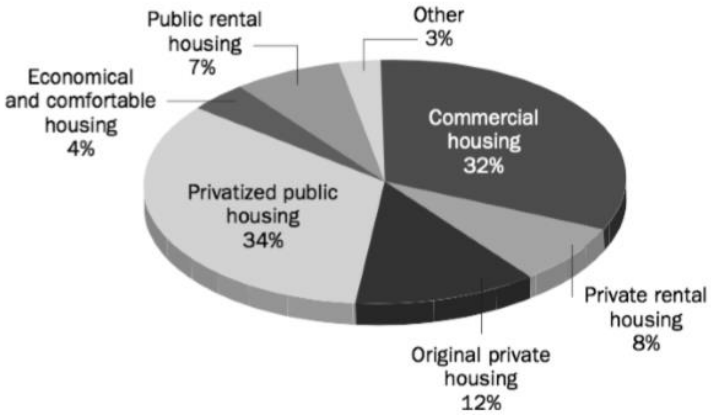


Fig.1 National housing stock composition; Source: Man, 2011; National bureau of statistics of China, 2007

Fig.2 Distribution of affordable housing and public rental housing in Beijing; Source: based on the Planning and Housing Construction in Beijing (2006-2010)

Therefore, suburb affordable housing attracts young professionals living outside the city centre. Besides, the high rental price in the centre also pushes young professional outside. Rent per month for one-bedroom apartment in the city centre is 6700 RMB. While the average monthly net salary is about 8126 RMB (2019), as shown in Figure 3. Thus renting one bedroom in the city centre means to spend more than 82% income on housing which is totally not affordable for young professionals, while the demand for housing in the city is still growing rapidly.

Rent Per Month	Average No.	Range
Apartment (1 bedroom) in City Centre	6,730.34 ¥	4,500.00 8,000.00
Apartment (1 bedroom) Outside of Centre	4,181.75 ¥	3,000.00 5,500.00
Apartment (3 bedrooms) in City Centre	15,506.98 ¥	11,000.00 25,000.00
Apartment (3 bedrooms) Outside of Centre	9,370.69 ¥	6,000.00 12,000.00
Buy Apartment Price		
Price per Square Meter to Buy Apartment in City Centre	101,009.73 ¥	80,000.00 125,000.00
Price per Square Meter to Buy Apartment Outside of Centre	51,391.30 ¥	40,000.00 60,878.00
Salaries And Financing		
Average Monthly Net Salary (After Tax)	8,125.96 ¥	
Mortgage Interest Rate in Percentages (%), Yearly, for 20 Years Fixed-Rate	5.00	4.50 5.60

These data are based on 263 entries in the past 18 months from 45 different contributors.
Last update: May 2019

Fig.3 Rent per month vs Salaries; Source: NUMBEO https://www.numbeo.com/property-investment/in/Beijing, on May 2019

In summary, suburb affordable housing and unaffordable housing price in city centre lead to young professionals living outside the centre. However, the large number of young professionals live in the suburbs but work right in the middle of the city, which aggravates job-housing separation, this will be explained in the following section.

1.2 Public Transport Accessibility

Job-housing separation refers to the phenomenon that large number of workers living in low-budget suburbs but works in the city centre due to concentrated distributed residential areas and working places. This leads to huge amounts of commuters spending two or more hours commuting a day (Zheng, S. et al., 2014). Job-housing separation leads to a long time commuting. A survey by Baidu (a Chinese internet company) showed that Beijing workers have the longest average commute in China. The average journey to work for Beijing commuters last year was 19.2km - the longest in China. Average commute time in Beijing was 52 minutes (China News Service, 2015), while in New York it was 48 minutes. Over the same period, the share of subway riders in public transit drastically increased, especially since 2008. In 1999 only 11.3% of transit riders used the subway. However, by 2014 the share of subway riders exceeded 40%. In 2014, transit overall achieved a 48% mode share of travel in the Beijing urban core (China Economic Net news 2014; China Quality Daily 2014).

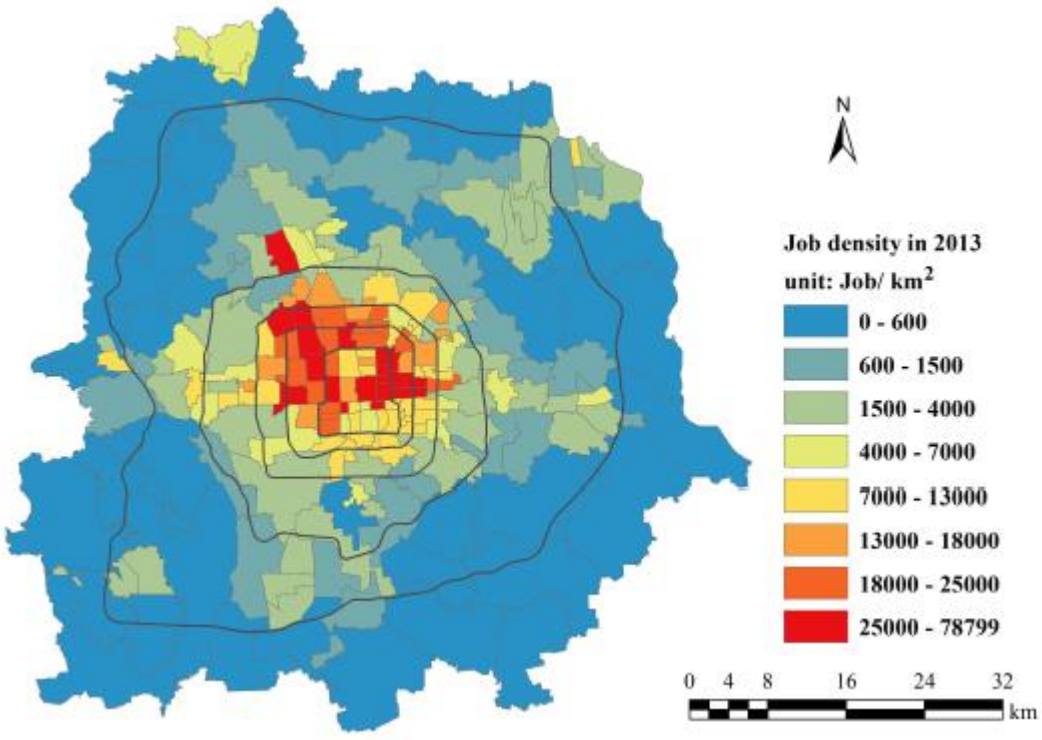


Fig.4 Employee opportunity density distribution in 2013; Source: Beijing City Lab

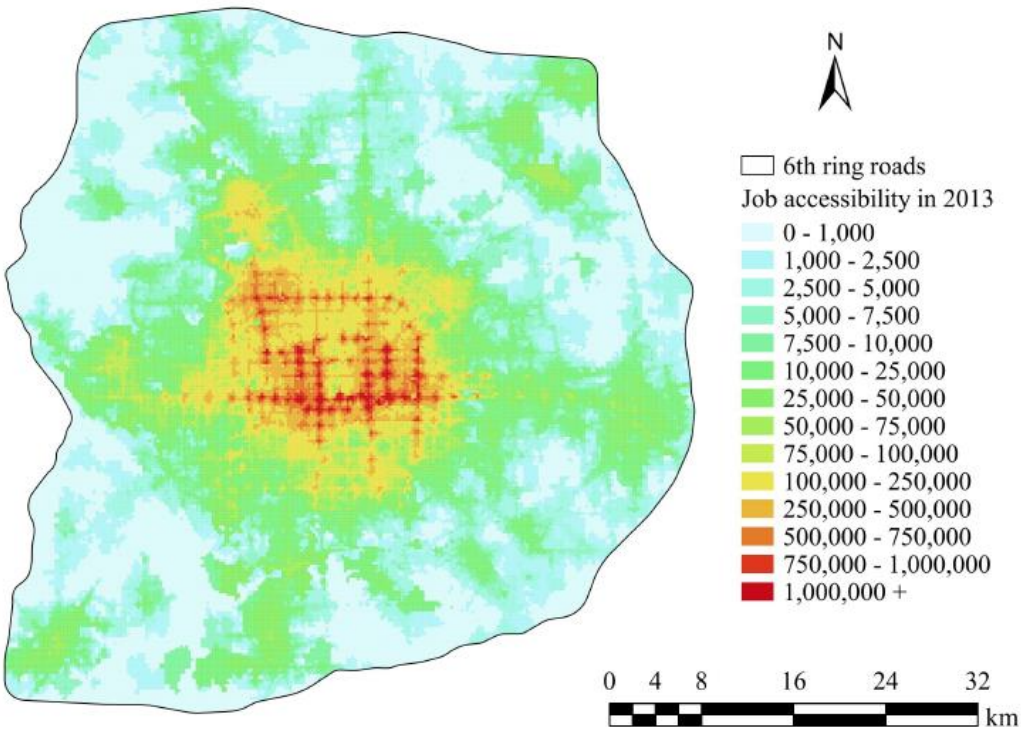


Fig. 5 Job accessibility by transit in 2013; Source: Beijing City Lab

Beijing Subway network is now the world's busiest in annual ridership, with 3.41 billion trips delivered in 2014, averaging 9.28 million per day, with peak single-day ridership reaching 11.56 million. In addition, there were 877 bus lines running 202,500 km daily in 2014.Figure 4 and Figure 5 show the employee opportunity density distribution and job accessibility by transit in the year of 2013. The overall the area within the 4th Ring Road has comparatively high accessibility and most of the north parts of this zone can reach more than 100,000 jobs in 30 minutes by walk and transit. There is comparatively less job accessibility outside the 4th Ring Road for there are fewer bus lines and employment opportunities. In addition, as expected the area within the highest job accessibility lies along with the main subway stations in the urban core. To be clear, there are some large sub-centres with job accessibility of more than 25,000 outside the 5th Ring Road. The job accessibility value decays with distance from subway stations.

Beijing's urban system has gradually evolved from a megacity-cantered pattern to a multi-centre one. But that doesn't ease the long-distance commute still, and this jobs-housing separation mode also resulted in poor commuting quality-overcrowding metro station hubs. Large range of residents living in the suburbs chooses subway for their daily commuting, while residents in city centre also take the subway to the workplace. A huge amount of commuters concentrates in those main transit stops during rush hour. This leads to overcrowding transit stations so that it would cost extra commuting time, and uncomfortable commuting experience.

1.3 Perceived Living Conditions of Young People

Due to imbalanced development between different regions in China an irreversible trend exists of large populations crowding into major cities under the high-speed urbanisation. Beijing, as the capital city of China, has a constant flow of workers into Beijing from other parts of China. The migration makes the housing problem caused by the unprecedented residential demand obvious and prominent (Wu&Wang, 2014). Meanwhile, college education makes the inter-provincial movement much easier for young people, making them an essential part of work- and house-hunting groups in cities (Ying et al., 2013). Many social changes such as the declining affordability of home ownership as well as delayed marriage and childbearing (Li&Li, 2006) make house sharing a popular residential choice for young people. However, recently there is a series of news on Chinese young professionals' living

environment draw a large amount of attention and was discussed widely. All of these fierce discussions suggested the embarrassing situation of young people and new professionals in the megacities. And this phenomenon also indicates that people start to be aware of the critical living condition of this particular group. It is no more ignored that new professionals are facing increasing critical housing condition in Beijing. The most frequently used words to describe young professionals' living condition is as following "overcrowding", "high-density", and "zero privacy" in those articles.

Crowding refers to the condition when "privacy mechanisms fail to function successfully, causing a person to have more interaction with others than is desired, that achieved privacy is less than desired privacy" (Altman, 1975). This definition includes two precondition factors for overcrowding. Firstly, the achieved level of social interaction does not match the level a person is desired. Secondly, the mechanisms in motion to achieve the desired level of social interaction fails. The desired level of social interaction is not static, but a dynamic boundary-regulation process. "Boundary-regulation systems change over time and have feedback loops that permit readjustments" (Altman, 1975). This dynamic process is originated from the human problem-solving model. The model stated that an individual's problem is said to exist when the image of his preferred environment does not match his actual environment (Marans, 1975). Thus, there are always gaps between desired and achieved level of social interaction. Individual adjustment or "coping responses" (by Altman) to this gap is recognised by Altman and defined as a privacy mechanism. Privacy mechanisms helps to deal with the imbalance of social interaction. In Altman's framework, privacy mechanism refers to "self and other mechanisms (verbal, paraverbal, nonverbal, personal-space, and territorial behaviours)" which helps to produce privacy - "the desired levels of social interaction". When these mechanisms help to achieve the desired social interaction, it is a successful privacy system, that is to say, controllable social interaction. Otherwise, social interaction would be out of control, then overcrowding occurs. The failure of privacy mechanism will result in psychological and physiological costs (Altman, 1975). Long term discomfort will lead to mental-health disorders or psychosomatic illness for instance stress. Providing "contact with the natural environment" (Dorst, 2011) helps to realise stress. Sustainable green such as parks, trees, plots in directly home environment helps to realise stress by offering places for a temporary escape from overcrowding situations.

Besides failed privacy mechanism, there is another factor leads to a feeling of crowding. High density, as a necessary though not sufficient factor, provides the condition for the feeling of being crowded (Stokols, 1975; Altman, 1975). "Physical density is hypothesised to increase the possibility that blocking of access to resources may occur." "Blocking access to resources occurs when someone is prevented from reaching a desired goal".(Altman,1975). For instance, in a group leasing unit, blocking access to resources refer to residents wait in line to use toilets, which increased the possibility of more aggression.

"Leasing group" is an overcrowding condition for high density and uncontrollable social interaction. There is no clear boundary defining territory belonging. This increases the possibility of personal space intrusion. Narrow space in group leasing units resulted extremely close contact with other tenants. This undesired close social interaction leads to discomfort and costs energy to adjust. Energy expenditure is required when residents strived to regulate their contact with other tenants. This includes physical effort to maintain a certain level of personal space and psychological effort in monitoring the meaning of their own (Altman, 1975). These "cost" may lead to psychological stress and debilitation, further resulted in sub-health status. Besides, those group leasing communities are in shortage of accessible green space. The shortage decreases the possibility of realising stress through temporary escape. In summary, "group leasing" is an overcrowding living condition where privacy mechanism fails or social interaction out of control, resulted from extreme high density and lack of contact with the natural environment.

1.4 Problem Statement

In summary, young professionals' horrible living situation has resulted from the confliction among living condition, housing affordability, and workplace accessibility. Confliction leads to three discomforting options for young professionals. The first choice is affordable and short time commuting units but in an extremely overcrowding condition where privacy mechanisms completely fail and lacking contact with nature environment. For instance, group leasing, where social interaction out of control and lacking greens for relieving mental stress. The second choice is short time commuting units in the centre with a better living condition. However, the majority of young professionals cannot afford to rent or buy these units. The third choice is affordable housing with a

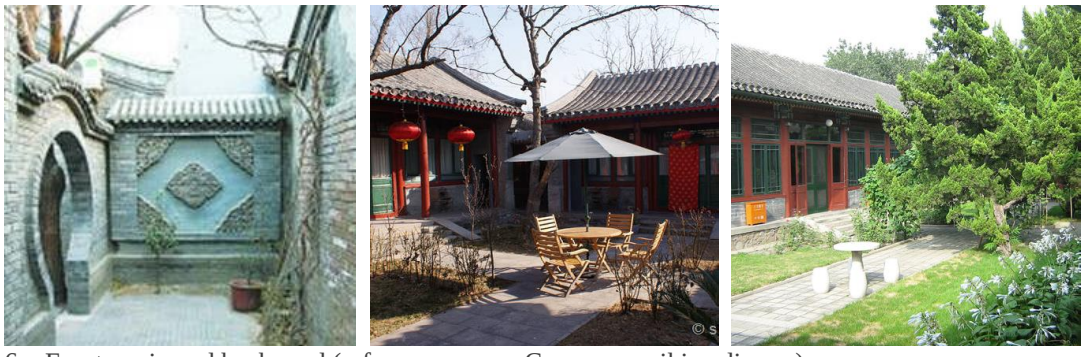
better living condition outside the city centre. These units locate in suburbs, extremely far away from the centre so that it takes a long time for commuting. Therefore, neighbourhood which is not overcrowding, meanwhile, affordable for young professionals, and provides efficient public transportation for commuting does not exist in Beijing. The aim of this research is to enhance young professionals living conditions through providing a liveable neighbourhood in terms of control of social interaction, affordable rental housing and efficient commuting public transportation system. Then research questions are listed as following: Q1. What kind of spatial qualities contribute to control on social interaction in the context of Chinese cultural cognition, from traditional drawings of this ancient city? Q2. What spatial quality contributes to a high density but not crowding housing typologies? Q3. What spatial quality of the natural environment contributes to realising stress?

2. A MORPHOLOGICAL STUDY OF DWELLING FORMS

We began with analysing several historical and existing housing types in Beijing. The typology analysis helps to draw specific principles and spatial elements in the context of Chinese culture cognitive. These principles and elements are reflections of concepts on control of social interaction. Typical housing typologies in Beijing are as following: Sihe Courtyard (Siheyuan) (Figure 6-a), Dazayuan, Danwei Compound, High-rise community, and urban village. Based on the concept of multi-zoning, zones of various levels of social interaction were mapped out (as indicated in Figure 9). This comparison indicates that Sihe Courtyard provides the most diverse zones of various levels of social interaction. We started looking at this best example as a legible territory in the context of Chinese cultural cognition. As its form precisely reflects the hierarchy of social interaction among relatives, friends and strangers, with various zones of levels of social interaction help to increase the possibility of achieving the match between achieved and desired social experience. According to this criterion, Sihe Courtyard is the most successful type offering control on social interaction for it provides the most diverse levels of social interaction.

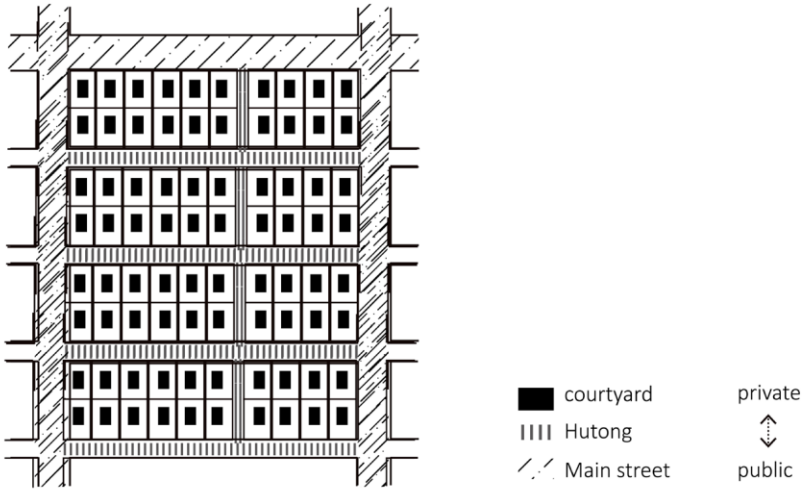
Legibility and territory of the traditional Chinese architecture started to achieve through multi-zones of courtyard and Hutong, nested grid and legible boundary (Figure 7-a). Multi-zones consist of yards and hutongs, and nested grid indicates obvious spatial hierarchy through various road width. The comparison among those roads clearly indicates the different degree of publicness and privacy. Boundary, that corresponding to Chinese cognitive, signals the border between public, shared and private spaces.

6-a Transition between public and private Courtyard (building scale); 6-b Composition of Sihe Courtyard (reference source:SOHU.com, 2019)

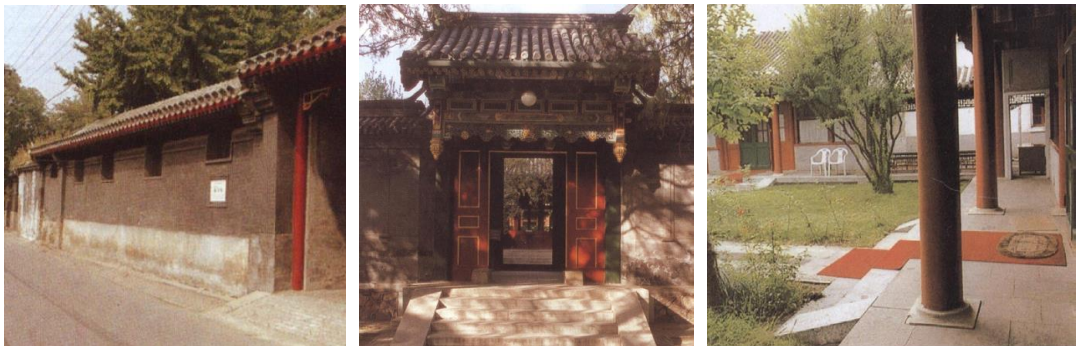


6-c Front, main and back yard (reference source:Commons.wikimedia.org)

Fig.6 Sihe Courtyard



7-a The nested grid and legible boundary of Hutong



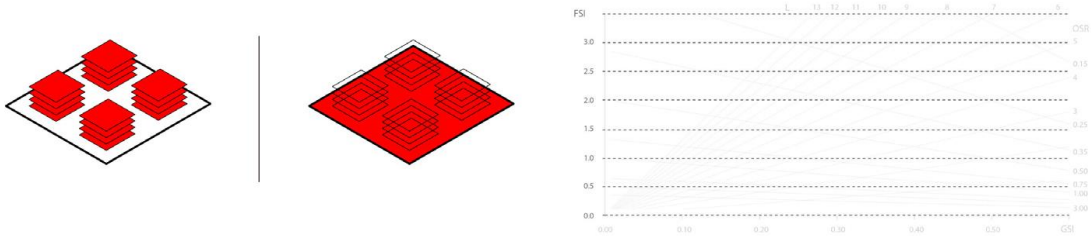
7-b High wall on the building facade; gate and step of the traditional Sihe Courtyard

Fig.7 Transition between public and private Hutong (neighbourhood scale)

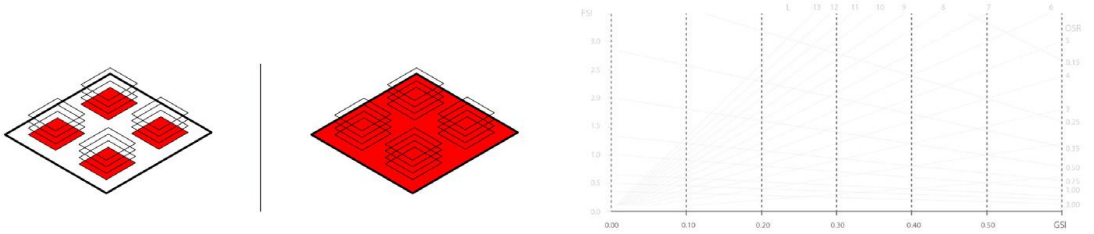
Hierarchical houses are a physical reflection of social interaction in the specific clan-based family. Quarters in the north would be given to the elders, eldest son and his wife live in the eastern building, younger son and his wife would live in the western building, fully grown grandson live in the opposite building in the south, and the unmarried daughters need to be accompanied by a servant girl living in the backside building behind the main northern building. These houses refer to relatively private zones in the traditional Sihe courtyard. They are well organised through outdoor courtyards. Courtyards, as relatively public zones, were assigned following levels of social interaction also. Social activities such as friends meeting often operated within the front courtyard which is the most public. Family affairs take place in the middle yard, which is the largest as the main yard in the Sihe courtyard. Backyard, as the most secluded space, providing outdoor space for unmarried daughters. In summary, these yards provide multi- zones of various levels of privacy in a unit scale. Middle yard always used as collective yard, which could be temporarily used as gathering place for parties, while front yard provides transitional domain between the entrance and the specific family territory, and back yard is a quiet private space with green in the direct home environment (Figure 6-c). Bamboo, flowers, and trees create a cozy atmosphere. Interior inside the Sihe courtyard is usually completely hidden from the street by enclosed walls, only small, high windows and the southern main gate interrupted the building façade (Zhai, 2015), as shown in Figure 7-b. These high walls and gates define the boundary between courtyard and hutong in a legible way, which clearly indicate courtyard units as more private domain comparing to Hutong. Whilst the traditional Western architecture was mainly purposed for practical needs, traditional Chinese architecture also encompassed spiritual, philosophical and socio-cultural aspects, and those Sihe courtyards within the traditional urban fabric could be the best examples for that.

It’s not possible to duplicate more Sihe courtyard in Beijing, but looking into the nowadays situation and comparing between the traditional residence and modern residence shows that privacy in a modern residence is not respected. Although this change may be due to modern lifestyle and new

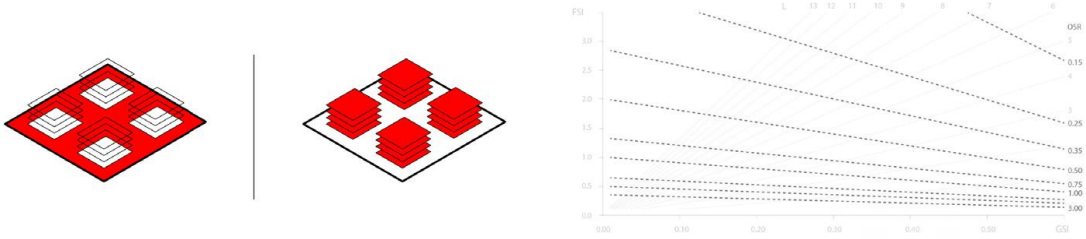
technology, it is necessary to consider briefly the physical and spiritual needs of human beings. On the other hand, as mentioned previously, crowding occurs when density can operate in quality of control on social interaction. Thus, spatial qualities that help to restrain this operation will contribute to a higher density but not crowding housing environment. Therefore the first step is to show the relation between density and quality of control on social interaction within those Chinese housing types. This section will describe and character those housing types by using a set of density variables – the method of Spacemate, which combining four density variables (FSI, GSI, OSR and L). FSI, expresses the built intensity of an area, it reflects population density. GSI, or coverage, identify y the relationship between built and non-built space, displays the compactness of an area. The extrema situation anonymous and social cage could be reflected through it. OSR, or spaciousness, is a measure of the amount of non-built space at ground level per square metre of gross floor area. This figure provides an indication of the pressure on non-built space. If more floor area is developed in an area (with the same footprint), the OSR decreases and the number of people who will use the non-built space increases (Berghauser, Haupt, 2010). It reflects outdoor usable area per capita. L, or height expresses the average number of floors of an area (reference resource: Berghauser, Haupt, 2010).



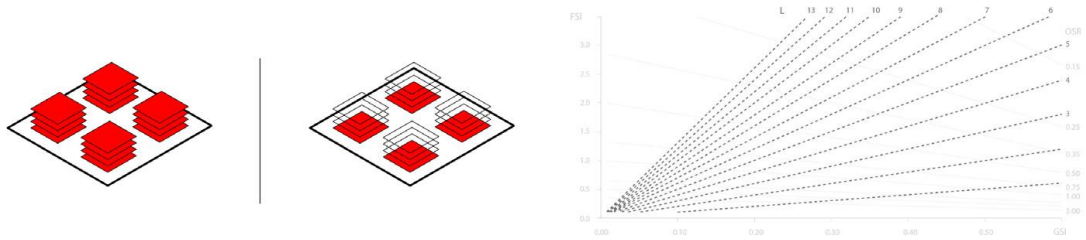
FSI_Floor Space Index (FSI=Gross floor area/plan area); FSI=the building intensity of an area



GSI_Ground Space Index (GSI=Built area/plan area); GSI=the compactness of an area



OSR_Open Space Ratio (OSR=Plan area-built area/gross floor area); OSR = the openness of an area and the pressure on the unbuilt space



L_Layers (L=gross floor area / built area); L=the average number of floors in the area

Fig 8. Spacemate reference source: Berghauser & Haupt, 2010.

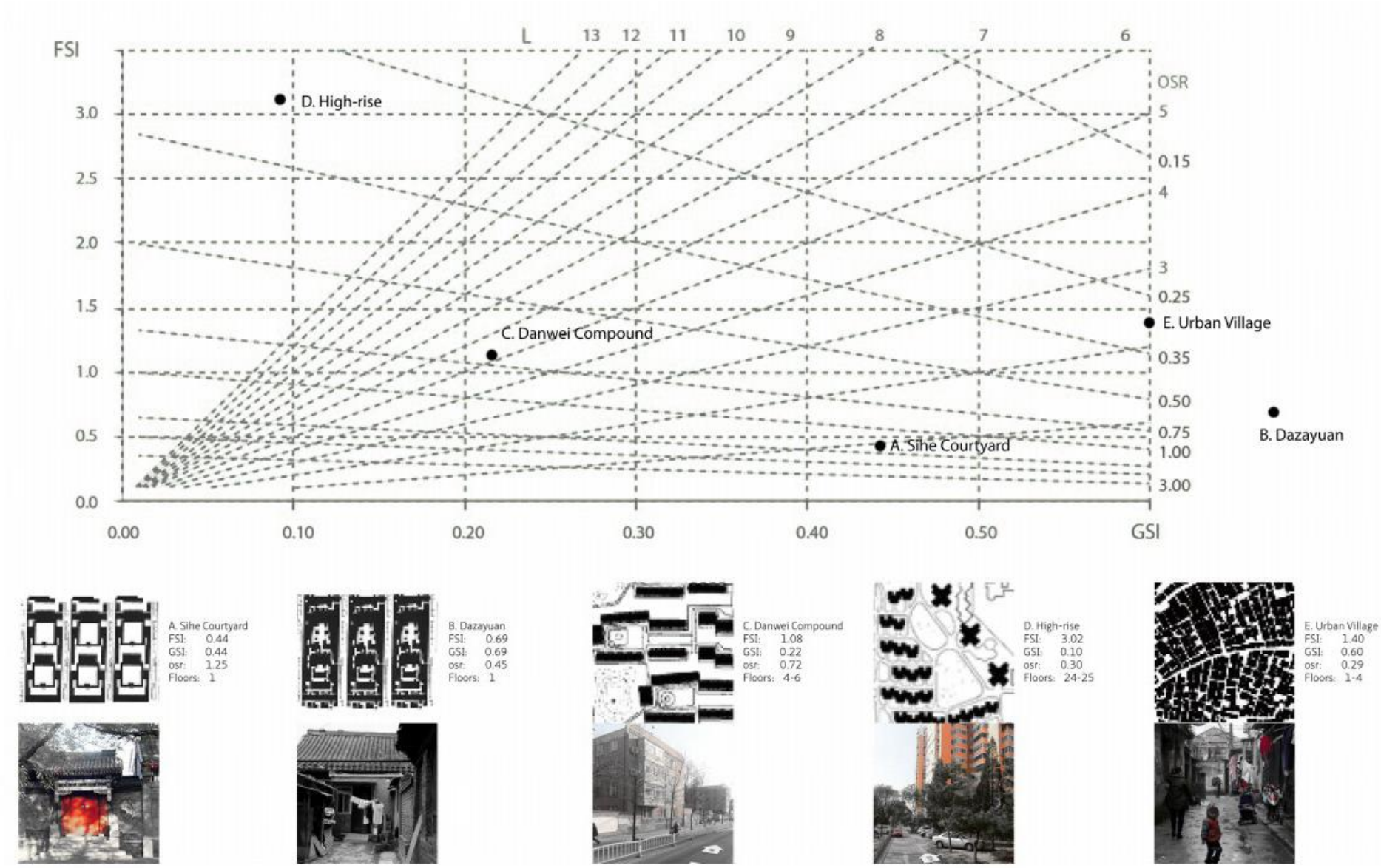
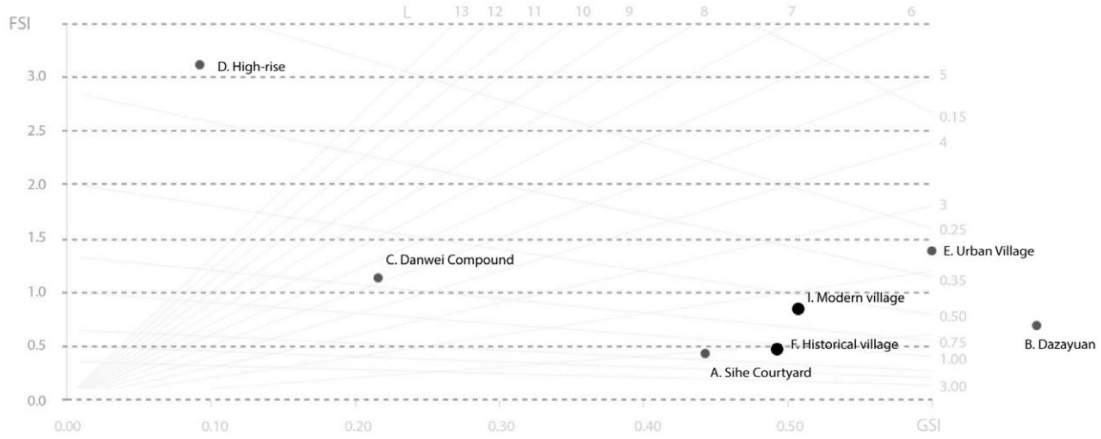


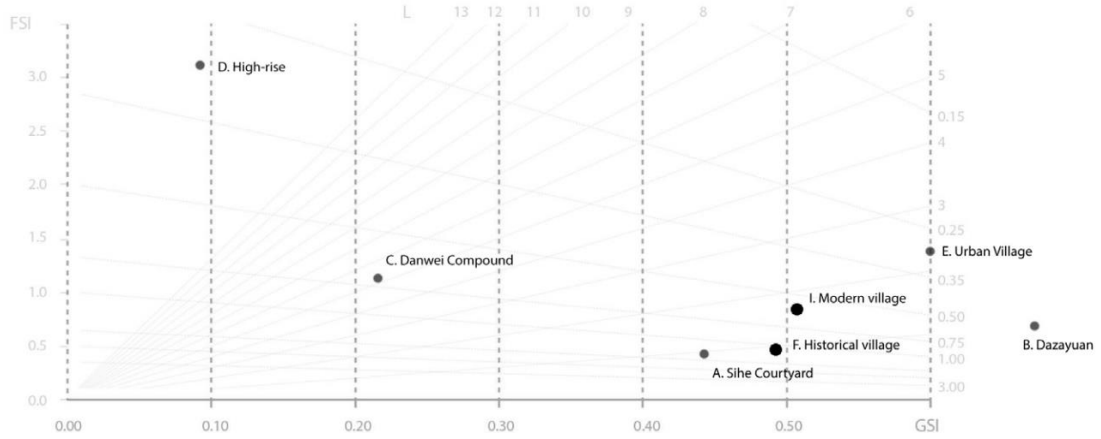
Fig.9 Chinese housing types in the Spacemate diagram

3. CONCLUSIONS AND FUTURE IMPLEMENTATIONS

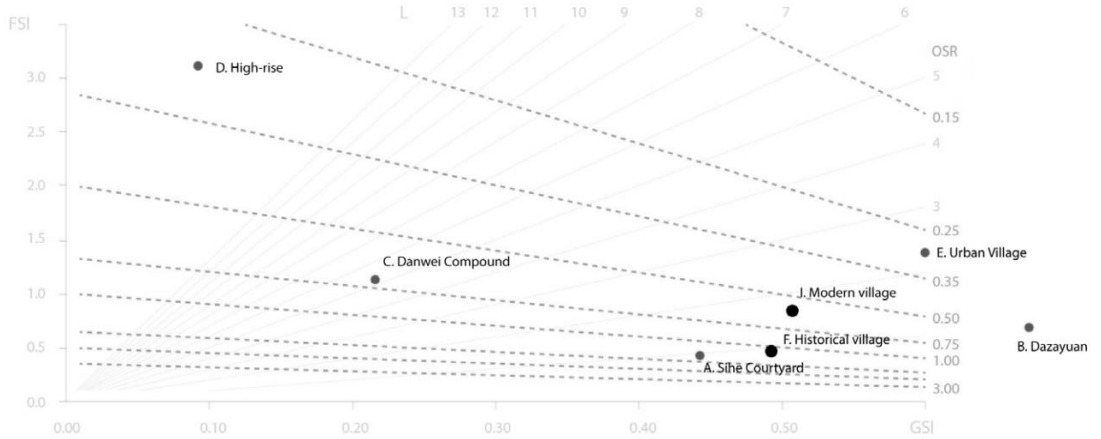
According to the comparison of those historical and existing housing types in Beijing, high-rise, urban village and Dazayuan are all high dense types. High-rise is a high-dense type for its high FSI, high intensity which reflects high population density. Urban village and Dazayuan are high-dense for high GSI, high compactness which reflects the relationship between built and non-built space (as shown in Figure 10-a). Although all of them are high-dense types, their qualities of control on social interaction are quite different. There is less level of social interaction achieved than desired in the high-rise, while more achieved than desired in urban village and Dazayuan. Residents in high-rise always do not know their neighbourhoods. In contrast, people in urban villages are so familiar with each other that strangers will be gazed with inquiring by residents.



10-a FSI diagram



10-b GSI diagram



10-c OSR diagram

Fig.10 Density of Chinese housing types

This difference has resulted from GSI variable. High compactness increases the probability of more social interaction. High-rise and urban village are both high dense types, with similar OSR (pressure on unbuilt space- the number of people who will use the non-built space) but different GSI (as the Figure 10-b and 10-c). The urban village has the highest compactness whereas high-rise has the lowest compactness. That leads to the conclusion that high compactness increases the probability that too much social interaction will be achieved than desired. Low compactness may lead to less social interaction achieved than desired, or the extreme situation of anonymous neighbourhood. Strategies, namely, control on social interaction, adaption to local ecological context, affordable housing, historical connection, public transport accessibility. Based on previous research and analysis, we could draw the following conclusions, towards the approaches aim to achieve a balanced harmony between landscape and city, history and future development as the context for neighbourhood design:

Firstly, multiple legible territories of various levels of privacy contribute to control on social interaction. According to the study on Sihe courtyard, nested grid, multi-zoning, boundaries are all approaches help to achieve legible territory in the context of Chinese cultural cognition. Besides, the width of the block in danwei (unit is Chinese) compound prove to be a reasonable dimension which facilitates proper compactness and density. Those territories could be grafted into this specific width of the block. Moreover, direct contact with the natural environment has to be offered by adjacent to green parks or woodlands. These green areas act as back-up to realise stress, in case of some individual needs temporary escape from overcrowding.

Secondly, adaption to local ecological context can be achieved by multi-density urban zones in the city scale and a blue-green network in neighbourhood scale. Various levels of urbanisation zones leave space and possibility of natural zones. These natural zones include natural buffer zone urban green parks for water storage in case of flooding. According to local topographic condition, lower altitude area is in high risk of flooding, that is to say, these areas are not suitable for urban construction. Therefore, these low altitude areas will be designed as natural zones. These nature space contribute to an ecological sustainable new town. Representation of natural zones in neighbourhood scale is the blue-green network. This network reacts to specific topography, meanwhile, provides recreational and ecological value. Moreover, it offers the possibility of an immediate contract with nature for local residents to realise stress.

Thirdly, affordable rental housing could be provided on the basis of the policy of cooperated public housing. Recently Chinese authority stated that government, farmer and developer could co-operate to manage offering public housing. Moreover, a diverse range of dwelling styles and densities provides housing choices to meet different housing needs of those people. These various housing types benefit developers then contribute to more affordable rental housing programs.

Fourthly, various degrees of preservation of existing villages in city scale is essential for maintaining the local identity in the new town. Preservation increases the possibility of a specific new town of its own identity in relation to its local historical context. Moreover, parcellation pattern and historical dwelling units will be transformed and utilised in further urban design process. These patterns and dwelling units have great potential to be designed as milestones, which remember future residents historical lifestyle.

Fifthly, accessibility to workplace refers to a seamless public transportation network to Beijing will be vital for urban new towns. It should consist of national high-speed railway, through inter-city train, inner-city railway, subway, bus. This seamless system mainly consists of high-speed railway and high speed inter-city railway, inner-city railway, subway. This system aims to offer a shorter commuting time. The seamless transportation system increases the possibility of inter-city commuting. Moreover, as a complement to this seamless transport system, reasonable walking or biking distance to transit hubs will be addressed in every neighbourhood.

REFERENCES

Altman, I. (1975). The environment and social behaviour: Privacy, personal space, territoriality and crowding. Brooks/Cole, Monterey.

Beijing City Lab. (2014). Bus routes and stops of Beijing.

Berghauser, P. M. & Haupt, I. (2004). Spacemate: the spatial logic of urban density. DUP Science, Delft.

BSB. (2014). Beijing Statistics in 2004 by Beijing Statistics Bureau.

China Economic Net news (2014), 'This year four subway lines opened in Beijing and public transportation travel Proportion reached 48 percent', website. URL: http://ce.cn/xwzx/gnsz/gdxw/201404/24/t20140424 2716400.shtml

China Quality Daily (2014), '2014 Beijing bus travel will increase to 48 URL: http://auto.people.com.cn/n/2014/0311/c153909-24600286.html

Dorst, M. J. (2010). Sustainable liveability: Privacy zoning as a physical condition for social sustainability, in Tolba, M.K. / Abdel-Hadi, A. / Soliman, S. (Ed.) Environment, Health, and Sustainable Development, Cambridge: Hogrefe and Huber. pp. 111-126.

Dorst, M., et al. (2005). "Privacy zoning, the different layers of public space." Spaces, Spatiality and Technology 5.

Huang, Y. (2004). Housing market government behaviors, and housing choice: A case study of three cities in China. Environment and Planning, A 36, 45–68.

Kutty, N. K. (2005). A new measure of housing affordability: Estimates and analytical results. Housing Policy Debate, 16(1), 113–142.

Li, S.M. and Li, L. (2006). Life course and housing tenure change in urban China: A study of Guangzhou, Housing Studies, 21(5), pp.653-670.

Lin, Y., et al. (2014). "Linking social housing provision for rural migrants with the redevelopment of 'villages in the city': A case study of Beijing." Cities 40: 111-119.

Lowe, R., Chirombo, J., & Tompkins, A. (2013). Relative importance of climatic, geographic and socio-economic determinants of malaria in Malawi. Malaria Journal, 12(1). doi: 10.1186/1475-2875-12-416

Marans, R. W. (1975). Basic human needs and the housing environment. Paper presented at the Institute of South African Architects Housing Conference, October 1975. Institute for Social Research and the College of Architecture and Urban Planning, University of Michigan.

Robst, J., Deitz, R. and McGoldrick, K.M. (1999). Income variability, uncertainty and housing tenure choice. Regional Science and Urban Economics, 29(2), pp.219-229.

Rosen, K. T., & Ross, M. C. (2000). Increasing home ownership in urban China: Notes on the problem of affordability. Housing Studies, 15(1), 77–88.

Shan, D. (2011). Chinese Vernacular Dwellings; Cambridge University Press: New York, NY, USA.

Shi, W., Chen, J. & Wang, H. (2015). Affordable housing policy in China: New developments and new challenges. Habitat International. 54. 10.1016/j. habitatint.2015.11.020

Wu, W. and Wang, G. (2014). Together but unequal: Citizenship rights for migrants and locals in urban China, Urban Affairs Review, 50(6): 781-805.

Wu, W. and Wang, G. (2014). Together but unequal: Citizenship rights for migrants and locals in urban China, Urban Affairs Review, 50(6): 781-805.

Ying, Q., Luo, D. and Chen, J. (2013). The determinants of homeownership affordability among the 'sandwich class: Empirical findings from Guangzhou, China. Urban Studies, 50(9): 1870-1888.

Zhai, Z. (2015). Conservational planning of old Beijing neighbourhoods. http://www.zhixuanzhai.com/Conservational-Planning-of-Old-Beijing-Neighbourhoods

Zhang, J. & Huo, X. (2002). "Human Scale in the Planning and Design of Ancient Beijing." World Architecture.